

A MONOGRAPH OF THE GENUS *ROSA* IN NORTH AMERICA. III. *R. SETIGERA*¹

WALTER H. LEWIS

*The Blandy Experimental Farm, University of Virginia, and Stephen F. Austin
State College, Nacogdoches, Texas*

ABSTRACT. The study of *Rosa setigera* Michx. (a diploid species in the section *Synstylae*) is discussed under the disciplines of gross- and micro-morphology, phytogeography, ecology (transplant experiments), cytology, and taxonomy.

Walter (1788) added to his description of *R. carolina* L. 1762 (= *R. palustris* Marsh.): "*varietates, calycis laciniis brevibus integris; et longis laciniatis.*" This is a clear reference to *R. setigera* as named and described by Michaux (1803) from material collected in lower Carolina and Georgia. Several striking characters in his description include stems with paired prickles, glabrous leaves, each 3 to 5 foliolate, and leaflet veins, petioles and sepals, hispid. Michaux also cited a variety of *R. setigera* with taller stems and scattered prickles having leaflets pubescent near the veins below and sepals with fewer bristles. Persoon (1806) called this variation with "leaflets pubescent toward the veins" var. *elatio*r. Aiton f. (1811) described *R. rubifolia* based upon a form with pubescent leaflets which had been introduced into the gardens of England. Lindley (1820) felt he could distinguish between *R. setigera* Michx. and *R. rubifolia* Ait. f. apart from the presence or absence of pubescence on the leaflets and established *R. rubifolia* var. *fenestralis* as a glabrous leafed form of *R. rubifolia*. This variety is synonymous with the typical *R. setigera*.

In 1820, Refinesque duplicated the work of Persoon (1806) and described *R. setigera* var. *pubescens*, a form with pubescent leaflet veins, but otherwise glabrous. He further described three species, *R. kentukensis*, *R. cursor*, and *R. trifoliata*, the former two descriptions approaching *R. rubifolia* while *R. trifoliata* is *R. setigera*.

The division of this complex at the specific level into individuals with leaflets glabrous below or with leaflet veins pubescent (*R. setigera*) and into individuals with leaflets puberulent, pubescent, or to-

¹ All techniques and methods used in this study are similar to those described for the monographic treatment of *Rosa acicularis* Lindl. (Lewis 1959b).

mentose below (*R. rubifolia*) was one approach followed in the last century and even until quite recent times (Rydberg 1918), especially by those who recognized no taxa below the rank of species. A more widely used treatment, however, is that proposed by Torrey and Gray (1840). They divided *R. setigera* into two varieties: (1) *glabra* with leaflets glabrous below, but including individuals with pubescent veins, and (2) *tomentosa* with leaflets entirely pubescent below. *Rosa rubifolia* was placed in synonymy under the latter variety.

Several minor forms have been described more recently. Palmer and Steyermark (1935) added two—*R. setigera* f. *inermis* (glabrous leaflets and unarmed stems) and *R. setigera* var. *tomentosa* T. & G. var. *serena* (tomentose leaflets and unarmed stems), the latter reduced to f. *serena* by Fernald (1948). A white petalled variant with somewhat smaller petals and pubescent leaflets is named *R. setigera* var. *tomentosa* f. *alba* Steyerm. (See Lewis 1959a).

GROSS MORPHOLOGY

From the states of Alabama, Arkansas, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Michigan, Missouri, New York, North Carolina, Ohio, Oklahoma, Pennsylvania, Tennessee, Texas, Virginia, and West Virginia, a total of 100 specimens (chiefly collected at random by the author) were examined for twenty-six morphological characters. The data for these are summarized for each character in Table 1.

Using the data from this sample, *R. setigera* populations can readily be differentiated from all others in North America. Its leaves, usually three foliolate, have large leaflets (\bar{x} =27.2 mm. wide and 47.8 mm. long) of which almost all (97%) are entirely eglandular and with many, coarse serrations (\bar{x} =37 per half leaflet). The stems are long, often to 5 meters, and are usually armed with large-based, curved, scattered or infrastipular thorns. Glands are generally found on the stipules (99%), petioles (100%), sepals (100%), pedicels (100%), and hypanthia (100%). The sepals are wide at their bases (\bar{x} =2.7 mm.) and are early dehiscent from the pea-shaped hip. These characteristics serve to readily distinguish *R. setigera* from all other *Rosa* either in the section *Synstylae* (characterized by exserted styles united into a column) or in the more typically North American sections *Cinnamomeae* and *Minutifoliae*.

Because of the intraspecific importance given to the lower surface of the leaflets, two hundred additional specimens have been examined at random for the following leaflet expressions: glabrous, glabrous but with pubescent veins, puberulent, and pubescent. A fifth possible

TABLE 1

Gross Morphological Data for *Rosa setigera*

100 individuals sampled at random		Measurements in mm.	
Character	Mean	s	$\bar{s}x$
Leaflet width	27.2	7.7	0.8
Leaflet length	47.8	12.0	1.2
Leaflet width	0.57	0.07	0.007
Leaflet length			
Serrations per half leaflet	37	8.5	0.9
Sepal width	2.7	0.5	0.1
Sepal length	12.2	1.8	0.2
Auricle width	3.2	0.8	0.1
Pedicle length	14.2	4.5	0.5
Flowers per inflorescence	6	3	0.3
		Per cent	
	<i>Absent</i>	<i>Present</i>	
Armature of floral stems	7	93	
	<i>Scattered & infra-stipular thorns</i>	<i>Infrastipular thorns</i>	
Kind of floral stem armature	90	10	
	<i>Single</i>	<i>Single & double</i>	<i>Double</i>
Kind of leaflet serration	59	17	24
	<i>Fine</i>	<i>Dentate</i>	<i>Acute</i>
Shape of leaflet serrations	0	31	69
	<i>Absent</i>	<i>Few</i>	<i>Numerous</i>
Leaflet serration glands	18	69	13
Leaflet glands below	97	3	0
Leaflet pubescence above	98	2	0
Leaflet pubescence below	29*	30	41
Stipule glands	1	97	2
Petiole bristles	4	93	3
Petiole glands	0	36	64
Petiole pubescence	20	67	13
Sepal glands	0	3	97
Sepal pubescence	0	11	89
Sepal bristles	100	0	0
Pedicle glands	0	6†	94†
Pedicle pubescence	90	10	0
Hypanthium glands	0	18†	82†

* Leaflets completely glabrous below or with pubescent veins only.

† Often deciduous with age.

expression, viz. tomentose, separable from pubescence only with difficulty, is recorded with the latter (see details under Taxonomy below).

MICROMORPHOLOGY

Pollen Grains.—Of the fifteen individuals studied, only nine plants could be measured for pollen grain size (Table 2). These gave an average pollen diameter of 33.4 μ ($s=2.3$ μ) with a mean range of from 31.1 μ to 36.0 μ . This average is considerably larger than for five other diploid ($2n=14$) species ($\bar{x}=27.9$ μ , $s=2.3$ μ), including *R. foliolosa* Nutt., *R. nitida* Willd., *R. palustris* Marsh., *R. Woodsii* Lindl., and *R. blanda* Ait., studied for pollen size. Compared with three tetraploid species (*R. arkansana* Porter, *R. virginiana* Mill., *R. carolina* L.) having an average pollen diameter of 33.4 μ ($s=2.3$ μ), there is no difference in size—by random sampling, the average diameters and deviations for *R. setigera* and the tetraploid species pollen are exactly alike. It should be noted that all species here compared with *R. setigera* (section *Synstylae*) are in a distinct morphological group (section *Cinnamomeae*) as revised (Lewis 1957).

Completely abortive pollen was found in the remaining six individuals. A similar observation has been made by Erlanson (1934). Of these plants, two were examined at PMC meiosis (Fig. 1 at late diakinesis, *Lewis 2079*; Fig. 6 at diakinesis, *Lewis 2321*). From *Lewis 2079*, the following numbers of meiotically regular cells were recorded: 3 at diakinesis, 5 at metaphase I, 1 at anaphase I, and 1 at anaphase II. Six cells at metaphase I and 3 at metaphase II from *Lewis 2321* were all regular. No case of irregular meiosis was noted. The cytological evidence does not suggest a cause for the abortive pollen condition.

From one specimen, *Lewis 2079*, pollen was examined in each of two years (Table 2). In 1953, the pollen was removed from the plant in Alabama, and in 1955, the pollen was taken from the same plant after two years growth in Virginia. Examination in both years gave 100 per cent of abortive pollen. It seems doubtful, therefore, that sterility is due to environmental conditions. This view is strengthened when the specimen, *Lewis 2080* (collected from an almost identical habitat only 3 miles distant from *Lewis 2079*), was found to have only 8 per cent of abortive pollen.

Only pollen sterility has been mentioned thus far. Fruit development was also found to be quite irregular. Of fourteen plants examined in September, 1956 (arboretum plots, Blandy Experimental Farm, Boyce, Virginia), eight had mature hips containing seed while

TABLE 2
Pollen Grain and Guard Cell Measurements for *Rosa setigera*

Locality	Pollen Grains				Abortive Per cent
	No.	Mean	s	sx	
var. <i>setigera</i>					
Ala.: Marshall Co., 2 mi. n. Guntersville, <i>Lewis</i> 2079 ¹	..	...	..	..	100(1953) 100(1955)
Ga.: Cobb Co., 5 mi. w. Mariette, <i>Lewis</i> 2078	35	33.1	1.6	0.3	25
Ga.: Troup Co., Lagrange, <i>Tracy</i> 9239	35	32.6	1.7	0.3	4
Ohio: Medina Co., Medina, <i>Lewis</i> 2307 ¹	35	31.1	1.5	0.3	40
Ohio: Tuscarawas Co., 4 mi. e. Newcomerstown, <i>Lewis</i> 2321 ¹	..	...	..	..	100
var. <i>tomentosa</i>					
Ala.: Marshall Co., 5 mi. n. Guntersville, <i>Lewis</i> 2080	38	31.8	1.9	0.3	8
Ill.: Union Co., Cobden, <i>Boott</i> 19 June 1861	..	...	..	..	100
Kans.: Linn Co., Trading Post, <i>Lewis</i> 2385	..	...	..	..	100
Nebr.: Cass Co., Weeping Water, <i>Bates</i> 5127	35	33.1	1.9	0.3	16
Mo.: Pike Co., Eolia, <i>Davis</i> 24 June 1913	35	36.0	1.8	0.3	60
N.Y.: Onondaga Co., Syracuse, <i>Lewis</i> 2184 ¹	35	33.2	2.0	0.2	34
Ohio: Summit Co., Akron, <i>Lewis</i> 2303	35	35.1	1.1	0.2	10
Penn.: Crawford Co., Kerrtown, <i>Lewis</i> 2193 ¹	35	34.7	1.7	0.3	13
Texas: Collin Co., 4.5 mi. w. McKinney, <i>Lewis</i> 3543 ¹	..	...	..	..	100
Va.: Montgomery Co., 1.5 mi. w. Blacksburg, <i>Lewis</i> 2009 ¹	..	...	..	..	100
	318	33.4	2.3	0.1	
Guard Cells					
var. <i>setigera</i>					
Ala.: Marshall Co., 2 mi. n. Guntersville, <i>Lewis</i> 2079 ¹	25	28.6	2.3	0.5	
Mo.: New Madrid Co., 3 mi. e. Matthews, <i>Lewis</i> 2350 ¹	25	30.7	3.2	0.6	
var. <i>tomentosa</i>					
Kans.: Bourbon Co., Devon, <i>Lewis</i> 2382	25	27.8	2.3	0.5	

¹ Chromosomes examined, all 2n = 14.

six individuals had entirely abortive hips with no seed formation. Consideration of these observations with the pollen data revealed that there were plants with (1) 100 per cent abortive pollen and no fruit set, (2) 100 per cent abortive pollen and a normal amount of fruit formed, and also (3) a low percentage of abortive pollen and a normal fruit set. Undoubtedly there is some mechanism affecting this condition in *R. setigera* (perhaps genetic?) that is as yet not understood.

Guard Cells.—The measurements of guard cells were made from the living (as opposed to herbarium or dried) leaflets of three different plants. The average lengths per plant of 28.6 u, 30.7 u, and 27.8 u gave a total mean of 29.0 u (Table 2). A comparison of these results with those of all other diploid species studied (see above under pollen grains), shows that a significant difference exists in guard cell size between *R. setigera* and the diploid *Cinnamomeae* species studied (mean range of from 20.4 u to 25.5 u). On the other hand, a comparison of the guard cell measurements of the tetraploid *Cinnamomeae* species (see above) having a range of from 27.5 u to 33.0 u and a total mean length of 29.9 u, with the measurements for *R. setigera*, emphasizes the similarity here of this diploid species with the tetraploid species.

It appears that in this case, only those species closely related morphologically have their guard cell and pollen grain sizes correlated with their chromosome numbers and that the more distantly related *R. setigera*, viz. in a different taxonomic section, possesses a somewhat different cell size relationship with respect to chromosome number.

PHYTOGEOGRAPHY

Rosa setigera occurs in the eastern half of the United States from eastern Nebraska and Kansas, central Oklahoma and Texas to the eastern foothills of the Allegheny Mountains, and in the province of Ontario. The northern limit of distribution is western New York, southern Ontario and Michigan, and probably southern Wisconsin, although no specimens have been seen from this state. The range is continuous south to central Georgia, Alabama, and eastern Texas. Only one specimen each from Florida and Louisiana has been examined and these unfortunately lack further locality data. No collections are known from Mississippi, but these can be expected to occur at least in the northern region of the state.

On the Atlantic seaboard, *R. setigera* is well established, especially in parts of New England, the environs of Philadelphia and Washington, and eastern New York. It is quite apparent on herbarium labels from these regions that the species has been introduced by man and is

now well established, as for example: Connecticut—"large patch of rank growth, some rods from nearest house, but of course escaped"; Prince Georges Co., Maryland—"a seedling flowering as an escape in abandoned garden near Bell Sta."; Ocean Co., New Jersey—"about abandoned habitation"; or Lehigh Co., Pennsylvania—"naturalized in fields". Even though a narrow strip now exists between the species natural distribution and the eastern distribution affected by man, the expected eastern dispersal of the former and the western expansion of the latter, will undoubtedly serve to decrease this gap.

So far as recorded in Fig. 9, both varieties of *R. setigera* are found in the states of Alabama, Arkansas, Connecticut, Illinois, Indiana, Kansas, Kentucky, Michigan, Missouri, New York, Ohio, Oklahoma, Tennessee, Texas, Virginia, and West Virginia. No geographical separation of these taxa appears to be possible. The only tendency indicated is a predominance of var. *setigera* in South Carolina, Georgia, and Alabama, but unfortunately collections are few in these states. Elsewhere, var. *tomentosa* is the more frequent. The three recognized forma are found infrequently, even in states such as Missouri where collections are numerous (Fig. 10).

*Selected specimens examined*¹ (only one collection from each county is listed and each is recorded on Figure 9 or 10).

A. *R. SETIGERA* var. *SETIGERA* (asterisks indicate introduced specimens).

ALABAMA. De Kalb Co.: Mentone, C. Mohr, Sept. 1898 (US). Marshall Co.: 2 miles north of Guntersville, W. H. Lewis 2079. Morgan Co.: Falkville, C. Mohr, June 1891 (US).

ARKANSAS. Benton Co.: Siloam Springs, D. Demaree 6903 (US). Craighead Co.: Brookland, D. Demaree 29086 (NO, PANS). Garland Co.: Hot Springs, E. J. Palmer 22995 (as var. *tomentosa*) (H). Newton Co.: Boxley, D. M. Moore 32498 (ARK). Sebastian Co.: Fort Smith, J. M. Bigelow, 1843-4 (US). Washington Co.: near Wheeler, E. J. Palmer 23269 (as var. *tomentosa*) (H).

CONNECTICUT. Hartford Co.: Farmington, C. A. Weatherby, 4 July 1896 (H)*. New London Co.: Voluntown, C. B. Graves, 5 July 1899 (H)*.

GEORGIA. Cobb Co.: 5 miles west of Mariette, W. H. Lewis 2078. Floyd Co.: Mount Berry, H. C. Jones 279 (GA). Morgan Co.: south of Madison, J. Bright 4908 (H). Oglethorpe Co.: 5 miles west of Philomath, A. Cronquist 4525 (H, US). Troup Co.: Lagrange, S. M. Tracy 9239 (H, NEB, US).

ILLINOIS. Peoria Co.: Peoria, J. C. McDonald, July & Oct. 1893 (H, US). Richland Co.: Gentry Creek, R. Ridgeway 137 (H).

INDIANA. Crawford Co.: 3 miles north of Leavensworth, C. C. Deam 16448 (H). Decatur Co.: 1 mile east of Alert, C. C. Deam 34273 (H). Dubois Co.: St.

¹ Those citations lacking an herbarium source were collected by the author and are filed in the Stephen F. Austin State College herbarium (ASTC). Duplicates will be given to the Southern Methodist University herbarium and the Smithsonian Institute.

Anthony, *C. C. Deam* 16521 (H). Harrison Co.: Palmyra, *W. H. Lewis* 2415. Jefferson Co.: 4 miles west of Madison, *C. C. Deam* 16202 (H). Lagrange Co.: $\frac{1}{4}$ mile south of Brushy Prairie, *C. C. Deam* 39111 (H, PH). Owen Co.: 1.5 miles east of Quincey, *C. C. Deam* 34332 (H). Scott Co.: 1 mile south of Scottsborough, *C. C. Deam* 16302 (H). Switzerland Co.: 4 miles north of Vevay, *C. C. Deam* 16165 (H).

KANSAS. Cherokee Co.: *A. S. Hitchcock* 676 (H, US).

KENTUCKY. Edmonson Co.: Mammoth Cave Nat. Park, *H. W. Lix* 351 (US). Estill Co.: Irvine, *W. A. Anderson, jr.* 45 (H). Jefferson Co.: near Fern Creek, *H. Bishop et al* 370 (GH). Metcalfe Co.: Edmonton, *W. H. Lewis* 2340. Muhlenberg Co.: Central City, *G. L. Fisher* 16 (US). Union Co.: Morganfield, *E. J. Palmer* 17833 (H).

LOUISIANA. No further data, *C. Mohr* (US).

MICHIGAN. Washtenaw Co.: Ann Arbor, *M. Dodder*, July 1931 (OKL).

MISSOURI. Greene Co.: Springfield, *S. Weller*, July 1892 (H). New Madrid Co.: 3 miles east of Matthews, *W. H. Lewis* 2350. Oregon Co.: Thomasville, *W. H. Lewis* 2363. Wright Co.: 5 miles south-west of Mansfield, *O. E. Lansing, jr.* 3174 (H).

NEW YORK. Albany Co.: near Glenmont, *H. D. House* 18396 (OKL)*. Chemung Co.: Elmira, *P. A. Munz* 17311 (OKL)*. Madison Co.: Oneida, *W. R. Maxon* 566 (US)(*?). Tompkins Co.: Ithica, *F. Coville*, 12 July 1885 (US)(*?).

OHIO. Gallia Co.: Gallipolis, *R. E. Horsey* 2260 (H). Jackson Co.: Jackson, *R. E. Horsey* 1742 (H). Medina Co.: Medina, *W. H. Lewis* 2307. Noble Co.: Dexter City, *W. H. Lewis* 2324. Tuscarawas Co.: 4 miles east of Newcomerstown, *W. H. Lewis* 2321.

OKLAHOMA. Haskell Co.: near Page, *G. W. Stevens* 2702 (OKL). Kay Co.: 4 miles west of Kaw City, *V. Viers* 36 (as *R. carolina*) (OKL). Le Flore Co.: Page, *O. W. Blakley* 1460 (H, OKL, US). McCurtain Co.: 6 miles south-east of Broken Bow, *M. Hopkins & G. L. Cross* 2397 (OKL). Ottawa Co.: Miami, *G. W. Stevens* 2292 (H, US). Pittsburg Co.: east of Hartshorne, *O. M. Clark* 2623 (OKL). Pushmataha Co.: 2 miles north-east of Kiamichi, *U. T. Waterfall* 616 (OKL).

SOUTH CAROLINA. Abbeville Co.: Abbeville, *A. C. Hexamer & F. W. Maier*, 7 June 1855 (as *R. setigera* var. *glabra*) (H). Berkeley Co.: Goose Creek, *A. C. Hexamer & F. W. Maier*, 19 May 1855 (as *R. carolina*) (H)(*?).

TENNESSEE. Bedford Co.: 2 miles south-east of Shelbyville, *A. J. Sharp et al.* 3702 (TENN). Coffee Co.: 4 miles south-east of Manchester, *RES et al.* 9039 (TENN). Dickson Co.: Woodhaven Lake, *EHC et al.* 14862 (TENN). Dyer Co.: west of Lane, *RES* 15855 (as var. *tomentosa*) (TENN). Franklin Co.: Sewanee, *W. H. Lewis* 2081. Grainger Co.: Rutledge, *Brown & Kamper* 9 (TENN). Hamilton Co.: near Chattanooga, *J. R. Churchill*, 3 June 1911 (H). Houston Co.: Erin, *E. J. Palmer* 17615 (H). Johnson Co.: near Mountain City, *R. L. James* 16692 (TENN). Knox Co.: Knoxville, *A. Ruth* 276 (US). Lewis Co.: Meriwether Lewis Nat. Mon., *W. B. McDougall* 1363 (US). Obion Co.: west of McConnell, *A. J. Sharp et al.* 6143 (TENN). Roane Co.: White Oak Creek, *F. R. Nease* 367 (DUKE, US). Sevier Co.: Gatlinburg, *G. S. Miller* 2286 (US). Stewart Co.: west of Dover, *FWW et al.* 13743 (TENN). Sullivan Co.: between Sullivan Gardens and Kingsport, *R. L. James* 18331 (TENN).

TEXAS. Bowie Co.: near Texarkana, *E. J. Palmer* 22435 (as var. *tomentosa*) (H). Camp Co.: 4 miles east of Pittsburg, *E. Whitehouse* 21292 (SMU). Harrison Co.: $8\frac{1}{4}$ miles east of Karnack, *H. B. Parks & V. L. Cory* 22832, 22833, 22834 (TAES). Rains Co.: Emory, *W. H. & M. E. Lewis* 3548 (ASTC, SMU). Rusk Co.:

Henderson, *W. H. & M. E. Lewis* 3556 (ASTC, SMU). Van Zandt Co.: 11 miles north of Edgewood, *E. Whitehouse* 16444 (SMU, US). Wood Co.: Mineola, *O. Sanders* 182 (SMU).

VIRGINIA. Montgomery Co.: 1.5 miles west of Blacksburg, *A. B. Massey* 5037 (H).

WEST VIRGINIA. Cabell Co.: Roland Park, *F. A. Gilbert* 472 (H, PENN, US). Marshall Co.: Sherrard, *W. V. U. Biological Expedition*, 18 June 1929 (W VA). Monongalia Co.: Morgantown, *Mr. & Mrs. H. A. Davis* 5213 (W VA). Wood Co.: Ogden, *W. H. Lewis* 2327.

B. *R. SETIGERA* var. *SETIGERA* f. *INERMIS*.

MISSOURI. Barry Co.: near Eagle Rock, *E. J. Palmer* 31439 (PH). Bollinger Co.: Patton, *E. J. Palmer* 39093 (HOLOTYPE) (A). Douglas Co.: 2½–3 miles south-east of Sweden, *J. A. Steyermark* 72528 (ARK). Taney Co.: Swan, *B. F. Bush* 47 (H).

C. *R. SETIGERA* var. *TOMENTOSA*.

CANADA. ONTARIO. Essex Co.: Sandwich, *J. Macoun* 34765 (H).

UNITED STATES. ALABAMA. Marshall Co.: 5 miles north of Guntersville, *W. H. Lewis* 2080. Mobile Co.: Mobile, *C. Mohr*, 23 April 1892 (US).

ARKANSAS. Benton Co.: 22 miles west-north-west of Rogers, *D. Demaree* 6821 (OKL). Carroll Co.: Clintonville, *D. Demaree* 6693 (as *R. rubifolia*) (H). Craighead Co.: Bono, *D. Demaree* 3523 (ARK). Faulkner Co.: south-west of Conway, *D. M. Moore* 520664 (ARK). Hempstead Co.: Fulton, *J. M. Greenman* 4393 (H). Howard Co.: 1 mile north of Saratoga, *H. H. Iltis, L. Shinnors, & H. Sumanth* 5143 (ARK). Jefferson Co.: Hooker, *D. Demaree* 21227 (H). Marion Co.: Cotter, *E. J. Palmer* 5978 (US). Miller Co.: 8 miles north-east of Texarkana, *E. Whitehouse* 20331 (SMU). Pike & Montgomery Co.'s: 3 miles north of Langley, *D. Demaree* 9783 (H). Poinsette Co.: Harrisburg, *D. Demaree* 17536 (H). Pope Co.: Hector, *G. M. Merrill* 22 (H). Pulaski Co.: opposite Metropolitan Negro Pk., Little Rock, *G. M. Merrill* 1250 (ARK), 1252, 2199 (H). Sharp Co.: Hardy, *D. Demaree* 26859 (OKL). Yell Co.: Dardanelle, *D. Demaree* 21290 (H, SMU).

CONNECTICUT. Hartford Co.: West Hartford, *C. H. Bissell*, 22 Aug. 1906 (H)*.

FLORIDA. No further locality, ex herb. *George Thurber* (H).

ILLINOIS. Cook Co.: Glencoe, *J. R. Churchill*, 1 Aug. 1926 (H). Edwards Co.: Grays, *E. J. Palmer* 15564 (H). Fulton Co.: Canton, *J. Wolf*, 1875 (US). Gallatin Co.: Shawneetown, *E. J. Palmer* 15490 (H). Hancock Co.: Augusta, *S. B. Mead*, 2 July 1847 (H). Island Co.: Port Bryon, *E. T. & S. A. Harper* (H). Jackson Co.: Makanda, *H. A. Gleason*, 16 July 1903 (H). Lawrence Co.: Red Hills State Park, *W. H. Lewis* 2409. La Salle Co.: near Ottawa, *E. J. Palmer* 40514 (H). Macon Co.: Decatur, *I. W. Clokey* 614 (H). Marion Co.: 3 miles east of Salem, *W. H. Lewis* 2404. Menard Co.: Athens, *E. Hall* (H). Peoria Co.: Peoria, *J. C. McDonald*, July – Oct. 1893 (H, US). Pope Co.: Golconda, *E. J. Palmer* 15355, 25753 (H). St. Clair Co.: *H. Eggert*, 19 June 1879 (US). Tazewell Co.: Illinois River, *F. E. McDonald* (H). Union Co.: Cobden, *W. Boott*, 19 June 1861 (H). Vermilion Co.: Kickapoo State Park, *G. N. Jones* 17880 (as *R. rubifolia*) (TAES).

INDIANA. Bartholomew Co.: 5 miles north-west of Columbus, *C. C. Deam* 34256 (H). Boone Co.: 8 miles west of Lebanon, *C. C. Deam* 17626 (H). Brown Co.: 1 mile south of Needmore, *C. C. Deam* 38946 (PH). Clarke Co.: Forest Reserve, *C. C. Deam* 23754 (H). Clinton Co.: 1.5 miles east of Cyclone, *C. C. Deam* 34364 (H). Howard Co.: Kokomo, *C. M. Ek* 15 (US). Jennings Co.: 2 miles west of Hayden, *C. C. Deam*

34203 (H). Lawrence Co.: Belt Railroad, south of Salt Creek, *R. M. Kriebel* 644 (DUKE). Marion Co.: 0.8 mile west of McCordsville, *R. C. Friesner* (H). Monroe Co.: 4.5 miles north-west of Bloomington, *C. C. Deam* 34311 (H). Newton Co.: 2.5 miles north-west of Kentland, *C. C. Deam* 39425 (H). Owen Co.: 2 miles south-east of Spencer, *C. C. Deam* 34322 (H). Putman Co.: 3 miles east of Cloverdale, *C. C. Deam* 34339 (H). Tipton Co.: railroad between Goldsmith & Kempton, *C. C. Deam* 13634 (H). Wells Co.: Harrison twp., *C. C. Deam*, 28 June 1903 (H).

IOWA. Story Co.: Washington twp., *A. Hayden* 11526 (H).

KANSAS. Bourbon Co.: Devon, *W. H. Lewis* 2382. Cherokee Co.: Stippville, *W. H. Lewis* 2375. Crawford Co.: 2 miles south of Farlington, *W. H. Lewis* 2379. Douglas Co.: Lawrence, *W. H. Horr* E146 (as *R. rubifolia*) (PENN, OKL). Labette Co.: Valeda, *E. J. Palmer* 41777 (H). Linn Co.: Trading Post, *W. H. Lewis* 2385. Miami Co.: Hillsdale, *W. H. Lewis* 2387.

KENTUCKY. Ballard Co.: La Center, *W. A. Anderson*, 3 June 1933 (H). Bath Co.: Owingsville, *W. H. Lewis* 2417. Logan Co.: Russellville, *W. H. Lewis* 2344. McLean Co.: Livermore, *E. J. Palmer* 17706 (H, US). Madison Co.: Richmond, *R. E. Horsey* 1182 (H). Marshall Co.: Brewers, *W. H. Lewis* 2348. Rockcastle Co.: near Conway, *E. L. Brown* 3118 (H). Shelby Co.: Clay Village, *W. H. Lewis* 2416.

MARYLAND. Prince Georges Co.: south of Glen Dale, *R. H. True* 325 (PENN)*.

MASSACHUSETTS. Berkshire Co.: Stockbridge, *R. Hoffmann*, 14 July 1919 (H)*.

MICHIGAN. Berrien Co.: vicinity of Niles, *C. K. Dodge & H. T. Darlington*, 25 Aug. 1917 (as *R. rubifolia*) (MSC). Washtenaw Co.: near Ypsilanti, *O. A. Farwell* 6215 (MICH).

MISSOURI. Adair Co.: Novinger, *E. J. Palmer* 25502 (H). Atchison Co.: near Watson, *E. J. Palmer* 18995 (as *R. rubifolia*) (H). Bates Co.: Montieth junction, *E. J. Palmer* 26066 (H). Boone Co.: Columbia, *F. Dronet* 502 (H). Butler Co.: Campbell, *B. F. Bush* 6307 (H). Cape Girardeau Co.: Cape Girardeau, *E. J. Palmer* 17989 (H). Carroll Co.: Carrollton, *E. J. Palmer* 20416 (H). Christian Co.: 4 miles east of Clever, *W. H. Lewis* 2369. Clay Co.: *B. F. Bush* 12756 (as *R. rubifolia*) (H). Clinton Co.: Wallace State Park, *W. H. Lewis* 2389. Cole Co.: *B. F. Bush* 12756 (as *R. rubifolia*) (H). Daviess Co.: Gallatin, *W. H. Lewis* 2393; Dent Co.: Howe's Mill, *E. J. Palmer* 34946 (H, PH). Douglas Co.: Ava, *W. H. Lewis* 2367. Grundy Co.: Galt, *W. H. Lewis* 2396. Holt Co.: near Forest City, *E. J. Palmer* 25403 (H). Howell Co.: 3 miles north-east of Grimmer, *W. H. Lewis* 2365. Iron Co.: near Ironton, *E. J. Palmer* 18110 (as *R. rubifolia*) (H). Jackson Co.: Buckner, *B. F. Bush* 12490 (as *R. rubifolia*) (DUKE, H). Jasper Co.: Fidelity, *W. H. Lewis* 2374. Johnson Co.: near Columbus, *E. J. Palmer* 36657 (H). Lincoln Co.: Silex, *J. Davis*, 24 June 1912 (SMU). McDonald Co.: Noel, *E. J. Palmer* 4279 (H). Macon Co.: Macon, *E. J. Palmer* 35952 (H). Marion Co.: Hannibal, *J. M. Bates*, 5 July 1916 (NEB). Oregon Co.: Alton to 8 miles east, *W. H. Lewis* 2361. Ozark Co.: near Gainesville, *E. J. Palmer* 34723 (H, US). Phelps Co.: Jerome, *J. H. Kellogg* 367 (H). Pike Co.: Eolia, *J. Davis*, 24 June 1913 (NEB), 11 June 1911 (H). Ripley Co.: Clark Nat. Forest, Briar, *W. H. Lewis* 2356. St. Clair Co.: Osceola, *B. F. Bush* 12806 (as *R. rubifolia*) (H). St. Louis Co.: North Canyon, Meramic Highlands, *M. Craig*, 27 June 1909 (H). Stoddard Co.: 3-4 miles east of Dudley, *W. H. Lewis* 2352.

NEBRASKA. Cass Co.: Weeping Water, *J. M. Bates* 5127 (H, NEB). Richardson Co.: Missouri River, *H. J. Webber* 271 (US), 5107 (NEB).

NEW HAMPSHIRE. Cheshire Co.: Keene, *E. J. C. Gilbert*, June 1889 (PH)*.

NEW JERSEY. Ocean Co.: Manahawkin, *B. Long* 27805 (H, PH)*.

NEW YORK. Erie Co.: Collins, *A. E. Perkins*, 24 July 1927 (H). Onandaga Co.:

Syracuse, *W. H. Lewis* 2184*. Oneida Co.: east of Oneida, *H. D. House* 6446 (H).
Thompkins Co.: Ithaca, *A. J. Eames* 8326 (H) (*?).

NORTH CAROLINA. Buncombe Co.: Swannonoa River, near Biltmore, *Biltmore herb.* 1320b (H, PENN).

OHIO. Champaign Co.: Thackery, *E. C. Leonard*, 1 July 1914 (US). Clinton Co.: south-west of Wilmington, *E. B. Harger* 8101 (H). Greene Co.: Xenia, *H. A. Young*, 10 July 1883 (H). Hardin Co.: Kenton, *R. E. Horsey* 742 (H). Lorain Co.: Oberlin, *A. E. Richsecker*, 29 June 1895 (US). Miami Co.: Piqua, *E. J. Palmer* 43616 (US). Richland Co.: Mansfield, *E. Wilkinson*, 7 July 1895 (OKL). Summit Co.: Akron, *W. H. Lewis* 2303.

OKLAHOMA. Atoka Co.: north of Atoka, *G. T. Robbins* 2563 (OKL). Bryan Co.: Bennington, *E. J. Palmer* 10440 (H). Carter Co.: 5 miles north-east of Ardmore, *L. L. Penny* 85 (OKL). Cherokee Co.: east of Mount Gibson, *R. Bebb* 4206 (as *R. cherokeeensis*) (OKL). Choctaw Co.: Hugo, *E. J. Palmer* 9021 (H). Cleveland Co.: *H. A. Hawk* 10 (OKL). Coal Co.: 10 $\frac{2}{3}$ miles north-north-west of Coalgate, *V. L. Cory* 56293 (SMU). Haskell Co.: Stigler, *B. Osborn* 413R (H). Johnston Co.: 5.2 miles south-east Tishomingo, *V. L. Cory* 58880 (SMU). McCurtain Co.: south of Haworth, *A. & R. Nelson, & G. J. Goodman* 5401 (OKL). Marshall Co.: east of UOBS, *P. B. Riggs*, 15 June 1952 (SMU). Mayes Co.: 3 miles north-east of Locust Grove, *C. S. Wallis* 4067 (SMU). Murray Co.: Sulphur, *G. M. Merrill* 1639 (H). Muskogee Co.: Muskogee, *R. Bebb* 5966 (as *R. cherokeeensis*) (OKL). Ottawa Co.: Miami, *G. W. Stevens* 2292 (OKL). Pontotoc Co.: 3-4 miles south-east of Fittstown, *G. T. Robbins* 2549 (OKL). Pottawatomie Co.: near Shawnee, *B. Osborn* 1599R (H). Seminole Co.: 3 miles south of Maud, *M. Faulkner* 128 (OKL). Sequoyah Co.: 5.4 miles north-east of Gore, *C. S. Wallis* 3988 (SMU).

PENNSYLVANIA. Crawford Co.: Kerrtown, *W. H. Lewis* 2193. Delaware Co.: $\frac{1}{4}$ mile south-west of Pleasant Hill, *C. I. Stiteler*, 28 June 1951 (PH)*. Lehigh Co.: 2.5 miles south-east of Alburtis, *R. L. Schaeffer* 32935 (PH)*. Monroe Co.: Shawnee on Delaware, *S. L. Glowenke*, 29 June 1936 (H)*.

TENNESSEE. Blount Co.: Rich Mountain, *LRH & AJS* 1682 (as *R. rubifolia*) (TENN). Davidson Co.: Nashville, *A. Gattinger* 9a (H). Dyer Co.: north of Ro Elen, *A. J. Sharp et al.* 6297 (TENN). Gibson Co.: north-west of Trenton, *L. Nicholson et al.* 17767 (TENN). Grainger Co.: Lea Lakes, *AJS & LRH* 1593 (as *R. rubifolia*) (TENN). Hickman Co.: below Beaver Dam Springs, *A. J. Sharp et al.* 47-459 (TENN). Knox Co.: Knoxville & vicinity, *C. S. Sargent*, 20 Sept. 1885 (H). Obion Co.: 1.5 miles east of Clayton, *D. E. & M. S. Eyles* 8394 (as *R. rubifolia*) (H). Rutherford Co.: 12.3 miles south of Murfreesboro, *L. Hubricht* B2150 (TENN). Sullivan Co.: between Sullivan Gardens - Kingsport, *R. L. James* 18331 (TENN). Union Co.: Norris Lake Forest, *A. Morrison*, 15 June 1937 (TENN).

TEXAS. Bowie Co.: 6 miles west of Texarkana, *E. Whitehouse* 20121 (as *R. rubifolia*) (SMU). Collin Co.: 4.5 miles west of McKinney, *W. H. & M. E. Lewis* 3543 (ASTC, SMU). Dallas Co.: Dallas, *M. Stephenson*, 23 Aug. 1928, 28 May 1929 (US). Fannin Co.: 2 $\frac{3}{4}$ miles south-east of Bonham, *V. L. Cory* 54687 (GA, SMU). Grayson Co.: Denison, *E. J. Palmer* 12614, 14272 (H, US). Gregg Co.: 2 miles south of Gladewater, *W. H. & M. E. Lewis* 3554 (ASTC, SMU). Harrison Co.: Marshall, *E. J. Palmer* 7914 (H). Henderson Co.: 2 $\frac{2}{3}$ miles south-east of Eustace, *V. L. Cory* 53896 (SMU). Hopkins Co.: Sulphur Springs, *L. H. Shinnars* 15036 (SMU). Hunt Co.: 3 miles south-east of Greenville, *W. H. & M. E. Lewis* 3545 (ASTC, SMU). Lamar Co.: $\frac{1}{3}$ mile east of Chicotah, *V. L. Cory* 54670 (GA, SMU). Morris Co.: 8 miles south of Daingerfield, *V. L. Cory* 25693 (as *R. Woodsii*)

(H). Nacogdoches Co.: *H. B. Parks*, 19 May 1936 (ASTC). Rains Co.: 1.9 miles north-west of Point, *W. H. & M. E. Lewis* 3547 (ASTC, SMU). Red River Co.: 7.5 miles north-east of Clarksville, *R. McVaugh* 7188 (SMU). Rockwall Co.: 3.5 miles south-west of Rockwall, *V. L. Cory* 52318 (SMU, TAES, US). Rusk Co.: Henderson, *W. H. & M. E. Lewis* 3557 (ASTC, SMU). Smith Co.: Beauchamp Springs, Tyler St. Pk., *V. L. Cory* 56909 (SMU, US). Titus Co.: 3 miles north of Mount Pleasant, *L. H. Shinnors* 16099 (SMU, TAES). Upshur Co.: Rosewood, *W. H. & M. E. Lewis* 3551 (ASTC, SMU). Wood Co.: 4.5 miles west of Quitman, *W. H. & M. E. Lewis* 3550 (ASTC, SMU). Van Zandt Co.: 2.5 miles south-east of Ben Wheeler, *R. Kral* 1027 (FSU).

VIRGINIA. Fauquier Co.: near Hopewall Gap, Bull Run Mts., *H. A. Allard* 7804 (H)*. Montgomery Co.: 1.5 miles west of Blacksburg, *W. H. Lewis* 2009.

WEST VIRGINIA. Cabell Co.: Huntington, *F. A. Gilbert* 125 (WVA). Jackson Co.: near Fair grounds, *W. V. U. Botanical Expedition*, 24 June 1930 (WVA), 28 June 1930 (H). Tyler Co.: Middleborne, *W. V. U. Biological Expedition*, 16 June 1931 (WVA). Upshur Co.: Buckhannon, *C. F. Millspaugh* 395 (WVA). Wayne Co.: Buffalo Creek, *L. Plymale* 26 (WVA).

D. *R. SETIGERA* var. *TOMENTOSA* f. *SERENA*.

ARKANSAS. Baxter Co.: Cotter, *E. J. Palmer* 26216 (as *R. setigera* var. *serena*) (OKL). Marion Co.: Bull Shoals, *D. Demaree* 30180 (as *R. setigera*) (DUKE, US). Randolph Co.: Ravenden Springs, *D. Demaree* 29186 (as *R. setigera*) (OKL).

IOWA. Louisa Co.: near Columbus junction, *A. Hayden* 9180 (as *R. setigera* var. *serena*) (US).

MISSOURI. Crawford Co.: 1 mile west of Butts, *J. A. Steyermark* 41294 (as *R. setigera* var. *serena*) (US). Ozark Co.: near Tecumseh, *E. J. Palmer* 32902 (as *R. setigera*) (H). Taney Co.: Branson, *E. J. Palmer* 5897 (as *R. setigera*) (US).

OKLAHOMA. Latimer Co.: 25 miles east of McAlester, *J. C. Shirley* (H). Muskogee Co.: Braggs Hill road, *R. Bebb* 4967 (as *R. cherokeensis*) (OKL).

E. *R. SETIGERA* var. *TOMENTOSA* f. *ALBA*.

MISSOURI. Howell Co.: 7 miles south of West Plains, *J. A. Steyermark* 78797 (as *R. setigera* f. *alba*) (SMU). Reynolds Co.: 4 miles southeast of Bunker, *J. A. Steyermark* 72011 (HOLOTYPE) (F).

ECOLOGY: TRANSPLANT EXPERIMENT

A detailed morphological study of several plants as collected in the field was followed by a similar study over several years after the specimens had been moved to an arboretum plot (Blandy Experimental Farm in northern Virginia). One of these plants collected 1.5 miles west of Blacksburg, Virginia (*Lewis* 2009) was studied in 1953 (original), and later in 1955 and 1956 (at Blandy). Leaflet width and length measurements (of 5 apical leaflets each year) were greater in 1953 (28 mm. and 57 mm.) than in 1955 (27 mm. and 55 mm.) or 1956 (24 mm. and 43 mm.), although the ratio of leaflet width to length was not appreciably altered. A change from the shaded, moist, roadside microenvironment to an exposed, often dry, experimental plot was probably one factor contributing to a decrease in leaflet area.

In addition, year to year fluctuations in climate as well as varying conditions within a single growing season undoubtedly contributed to such modifications.

No appreciable differences were noted between the sepal width and length, auricle width, pedicel length, or number of serrations per half leaflet for these years. The number of flowers per inflorescence, however, was often greatly modified. The 1953 inflorescence for *Lewis 2009* contained a maximum of four flowers, while in 1955 and 1956, as many as ten flowers in an inflorescence were observed each year. This increase in flower number was apparent for all plants moved to the experimental plot (*Lewis 2079*, Ala.; *Lewis 2184*, N. Y.; *Lewis 2348*, Ky., and others). The transplanted specimens were further modified by the addition of petiole bristles, if not previously present, and by an increase in the amount of petiole pubescence and number of glands. The type of leaflet serration was also altered from either a biserrate or partly biserrate margin to a partly biserrate or simple serration, respectively. No noticeable change in either the absence or presence of leaflet pubescence or glands, sepal pubescence, glands, or bristles, pedicel glands, auricle glands, or hypanthium glands, was noted.

There would seem to be little doubt that the modifications of a number of character expressions for this species is traceable, partially at least, to environmental conditions.

CYTOLOGY

Two plants of *R. setigera* were examined cytologically by Täckholm (1922), who found the somatic number of fourteen. Although the regular formation of seven bivalents was predominant in PMC's, Täckholm did observe an occasional metaphase I with six bivalents and two univalents. Since he was unable to observe this condition affecting the later formation of gametes, he assumed that each univalent had gone to a respective pole. Both Hurst (1928) and Flory (1950) confirmed the somatic number. Erlanson (1929) found only regular meiosis (7 bivalents).

Of nine plants in which PMC meiosis was examined, 65 cells at meiosis I and II illustrated only complete regularity. Figures 1 through 6 are such examples of regular diakinesis and metaphase I from six individuals collected in a number of states. These and other plants are listed with their original localities in Table 3.

Immature leaflet tissue was examined for seven plants; all cells were regular with 14 somatic chromosomes (for example, Figures 7 and 8).



Figs. 1–8. Chromosomes of *R. setigera*—Fig. 1: var. *setigera* (Lewis 2079), PMC late diakinesis, 7 II. Fig. 2: var. *tomentosa* (Lewis 2387), PMC metaphase I, 7 II. Fig. 3: var. *setigera* (Lewis 2340), PMC diakinesis, 7 II. Fig. 4: var. *tomentosa* (Lewis 2417), PMC metaphase I, 7 II. Fig. 5: var. *tomentosa* (Lewis 2393), PMC metaphase I, 7 II. Fig. 6: var. *setigera* (Lewis 2321), PMC diakinesis, 7 II. Fig. 7: var. *tomentosa* (Lewis 2375), leaf metaphase, $2n=14$. Fig. 8: var. *tomentosa* (Lewis 2356), leaf metaphase, $2n=14$. Drawings with camera lucida at $\times 4200$, here reduced by ca. $\frac{1}{2}$ in reproduction.

Five cells from each of four plants indicate the following karyotype:

- 2 pairs long submedian chromosomes (bb, bb)
- 1 pair long subterminal chromosomes (cc)
- 2 pairs medium submedian chromosomes (ee, ee)
- 2 pairs medium subterminal chromosomes (ff, ff).

This chromosome morphology is different from that of any other diploid species examined(i.e., east of the Rocky Mountains). Not only are gross- and micro-morphological characters for *R. setigera* strikingly diverse from other diploid species in eastern North America, but chromosome morphology as well.

Of further interest is the larger size of the *R. setigera* chromosomes as compared with those of all other species studied. The longest chromosomes of this taxon are approximately 5 μ in length while the longest of the other species rarely exceed 3 μ . This increase in chromatin is probably associated with the greater cell size (see Micromorphology) encountered for this species as compared with other diploid taxa of the section *Cinnamomeae*.

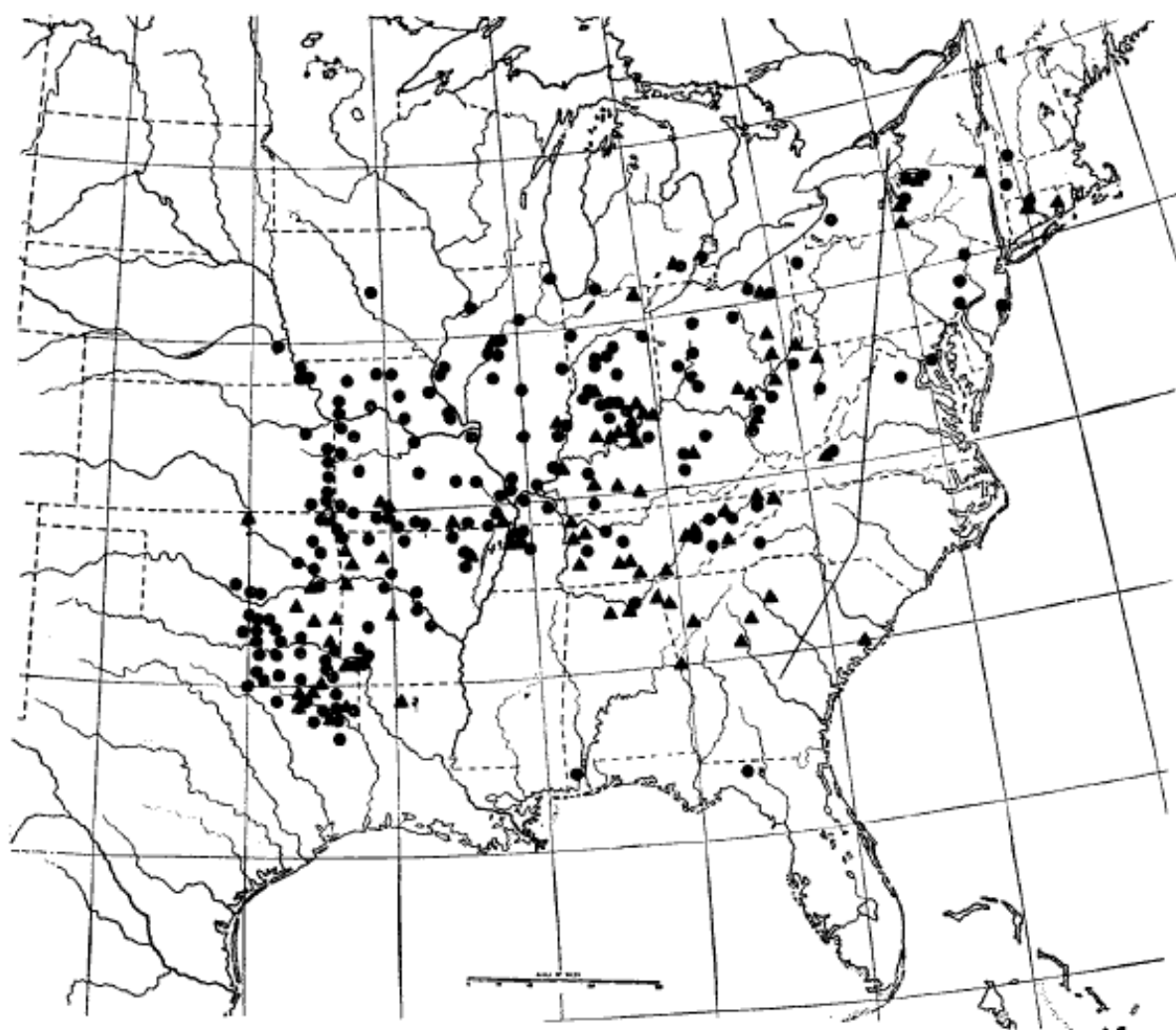


Fig. 9. The distribution of *R. setigera* as listed under Selected Specimens Examined. Triangles represent var. *setigera*, circles represent var. *tomentosa*.

TAXONOMY

Rosa setigera is divisible into two main taxa according to: (1) the absence of leaflet pubescence below except on the veins, var. *setigera*; or (2) the presence of leaflet pubescence, var. *tomentosa* T. & G. Several forma are recognized: *R. setigera* var. *setigera* f. *inermis* Palmer & Steyermer., *R. setigera* var. *tomentosa* f. *serena* (Palmer & Steyermer.) Fern., and *R. setigera* var. *tomentosa* f. *alba* Steyermer.

Key.

- a. Leaflets glabrous below or with pubescence on veins only
 - b. Floral stems armed var. *setigera*
 - bb. Floral stems unarmed var. *setigera* f. *inermis*
- aa. Leaflets pubescent below
 - b. Petals pink

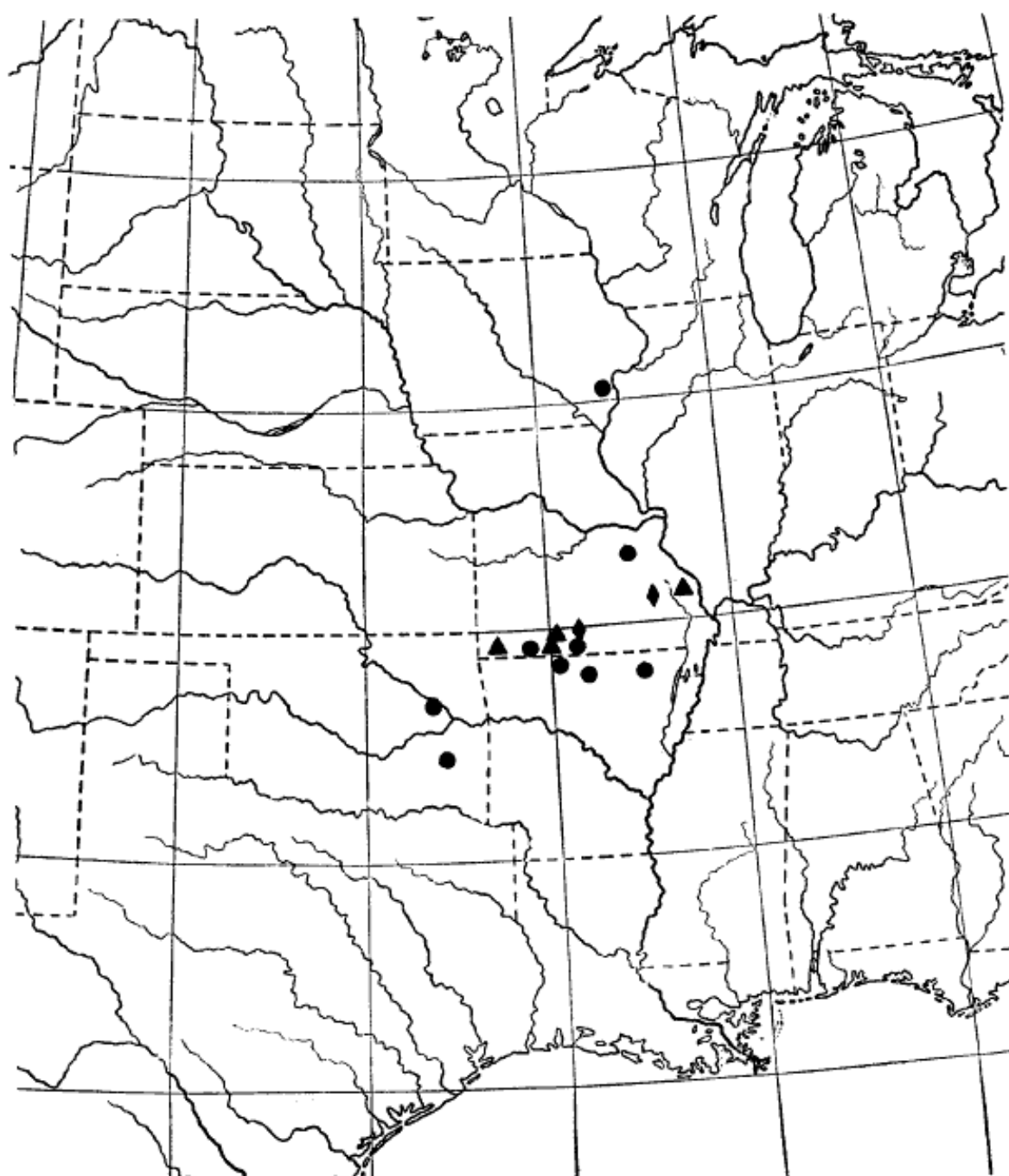


Fig. 10. The distribution of three forma of *R. setigera*: triangles represent var. *setigera* f. *inermis*, circles represent var. *tomentosa* f. *serena*, diamonds represent var. *tomentosa* f. *alba*.

- | | |
|--------------------------|--|
| c. Floral stems armed | var. <i>tomentosa</i> |
| cc. Floral stems unarmed | var. <i>tomentosa</i> f. <i>serena</i> |
| bb. Petals white | var. <i>tomentosa</i> f. <i>alba</i> |

Description (based on 100 individuals).

Stems climbing or trailing, 2–5 m. long, armed with scattered and infrastipular curved thorns to the apex of the floral branches (90%), or with infrastipular curved thorns only (10%), occasionally hispid, rarely unarmed (in f. *inermis* and f. *serena*); leaves 3–5 foliolate;

TABLE 3
Chromosome Numbers Reported for *Rosa setigera*

Locality and collection	n	2n	Fig.	Author
No. 20 and No. 21	7	14	..	Tackholm (1922)
"North America"	.	14	..	Hurst (1928)
"Ohio"	7	..	..	Erlanson (1929)
"Eastern & central North America"	.	14	..	Flory (1950)
Ala.: Marshall Co., 2 mi. n. Guntersville, <i>Lewis</i> 2079 ¹	7	..	x	Lewis
Ill.: Lawrence Co., Red Hills State Park, <i>Lewis</i> 2409	7	..	..	Lewis
Kans.: Cherokee Co., Stippville, <i>Lewis</i> 2375	.	14	x	Lewis
Kans.: Miami Co., Hillsdale, <i>Lewis</i> 2387	7	..	x	Lewis
Ky.: Bath Co., Owingsville, <i>Lewis</i> 2417	7	..	x	Lewis
Ky.: Metcalfe Co., Edmonton, <i>Lewis</i> 2340 ¹	7	..	x	Lewis
Mo.: Daviess Co., Gallatin, <i>Lewis</i> 2393	7	..	x	Lewis
Mo.: New Madrid Co., 3 mi. e. Matthews, <i>Lewis</i> 2350 ¹	7	..	x	Lewis
Mo.: Ripley Co., Briar, <i>Lewis</i> 2356	.	14	x	Lewis
N.Y.: Onondaga Co., Syracuse, <i>Lewis</i> 2184	.	14	..	Lewis
Ohio: Medina Co., Medina, <i>Lewis</i> 2307 ¹	.	14	..	Lewis
Ohio: Tuscarawas Co., 4 mi. e. Newcomerstown, <i>Lewis</i> 2321 ¹	7	..	x	Lewis
Penn.: Crawford Co., Kerrtown, <i>Lewis</i> 2193	.	14	..	Lewis
Texas: Collin Co., 4.5 mi. w. McKinney, <i>Lewis</i> 3543	.	14	..	Lewis
Va.: Montgomery Co., 1.5 mi. w. Blacksburg, <i>Lewis</i> 2009	.	14	..	Lewis

¹ *R. setigera* var. *setigera*; the remaining specimens are *R. setigera* var. *tomentosa*.

leaflets ovate or acute, rounded at the base and often acuminate at the apex, $\bar{x}=27.2$ ($s=7.7$) mm. in width, $\bar{x}=47.8$ ($s=12.0$) mm. in length, ratio of leaflet width to length, $\bar{x}=0.57$ ($s=0.06$), glabrous above (98%) or rarely pubescent (2%), glabrous below although often pubescent on the veins (29% in var. *setigera*), puberulent, pubescent, or tomentose below (71% in var. *tomentosa*), eglandular (97%) or slightly glandular below (3%), serration number per half leaflet $\bar{x}=37$ ($s=8.5$), singly serrate (59%), singly and biserrate (17%), or biserrate (24%), the serrations often obtuse, not gland-tipped (18%) or with glands (82%); petioles without bristles (4%) or typically with bristles (96%), often extending along the mid-vein

of the leaflet, glandular and often extending along the mid-vein, glabrous (20%) or pubescent (80%); stipules adnate, rarely eglandular (1%) or commonly glandular (99%) on the margin and abaxial surface, with one auricle $\bar{x}=3.2$ ($s=0.8$) mm. in length; inflorescence usually corymbose, 1–15 flowered ($\bar{x}=6$, $s=3.1$); pedicels $\bar{x}=14.2$ ($s=4.6$) mm. in length, glandular, often deciduous with age, glabrous (90%) or somewhat pubescent (10%); sepals $\bar{x}=2.7$ ($s=0.5$) mm. wide at the base, $\bar{x}=12.2$ ($s=1.8$) mm. long, glandular-hispid, pubescent on the outside, tomentose within, without bristles; petals pink, white, or intermediate, obcordate; styles exserted, united; hypanthium globose or rounded-ellipsoid, glandular-hispid, the glands and stalks often deciduous with age; pollen grains $\bar{x}=33.4$ ($s=2.3$) μ in diameter; guard cells $\bar{x}=29.7$ μ in length; chromosome number $2n=14$.

Synonymy.

- A. *Rosa setigera* Michx. var. *setigera*, Fl. Bor.-Am. 1: 295 (1803).
R. carolina L. (1762), Walter Fl. Carol. 149 (1788) pro parte.
R. setigera Michx. var. *elatio* Pers., Syn. Plant. 2: 48 (1806).
R. fenestrata Donn, Hort. Cantab., ed. 7, 154 (1812)—name only; Tratt., Rosac. Mon. 2: 187 (1823).
R. rubifolia Ait. f. var. *fenestralis* Lindl., Ros. Mon. 125, t. 15 (1820).
R. setigera Michx. var. *pubescens* Raf., Ann. Gen. Sci. Phys. 5: 213 (1820).
R. trifoliata Raf., Ann. Gen. Sci. Phys. 5: 213 (1820).
R. setigera Michx. var. *glabra* Torrey & Gray, Fl. N. Am. 1: 458 (1840).
R. rubeae At., Ark. f. Bot. 16 (9): 19 (1920) pro parte.

Holotype. "Georgie", Michaux (H. photograph).

- B. *Rosa setigera* Michx. var. *setigera* f. *inermis* Palmer & Steyerl., Ann. Mo. Bot. Gard. 22: 569 (1935).

Holotype. Patton, Bollinger Co., Missouri, E. J. Palmer 39093 (A).

- C. *Rosa setigera* Michx. var. *tomentosa* Torrey & Gray, Fl. N. Am. 1: 457 (1840).
R. rubifolia Ait. f. in Ait., Hort. Kew., ed. 2, 3: 260 (1811).
R. kentukensis Raf., Ann. Gen. Sci. Phys. 5: 213 (1820).
R. cursor Raf., Ann. Gen. Sci. Phys. 5: 215 (1820).
R. mutabilis Bradb. (non Courset 1811) in James, Account Long's Exp. Rocky Mts. 1: 69 (1823).
R. rubifolia Ait. f. var. *macrophylla* Ser. in DC., Prod. 2: 599 (1825).

- ? *R. laevigata* Borrer (non Michx. 1803) in Hook., Fl. Bor. Am. 1: 200 (1832).
R. rubeae At., Ark. f. Bot. 16 (9): 19 (1920) pro parte.
D. *Rosa setigera* Michx. var. *tomentosa* T. & G. f. *serena* (Palmer & Steyererm.) Fern., Rhod. 50: 145 (1948).
R. setigera Michx. var. *serena* Palmer & Steyererm., Ann. Mo. Bot. Gard. 22: 569 (1935).
E. *Rosa setigera* Michx. var. *tomentosa* T. & G. f. *alba* Steyererm. Rhod. 54: 254 (1952). *Holotype*. 4 miles southeast of Bunker, Reynolds Co., Missouri, J. A. Steyermark 72011 (F).

From a cross of *R. setigera* var. *setigera* and *R. setigera* var. *tomentosa* (Erlanson 11790), Erlanson found (personal letter of 26 October 1956) all four progeny with pubescent leaflets. Of the 300 individuals examined in the present study for the expression of the leaflet surface below, 70 per cent were found to have pubescent leaflets (36% puberulent and 34% pubescent) while the remaining 30 per cent were glabrous including the pubescent veined variation. Of these, 10 per cent had completely glabrous leaflets. It will be recalled that in the transplant experiments, leaflets of no plant were modified from pubescent to glabrous, or vice versa, by a change of environment. It is presumed that the various expressions are not due primarily to the environment, but rather to some other factor.

From the above discussion, it seems probable that this 'character' is controlled by two, or perhaps more, pairs of alleles giving at least four possible phenotypic expressions in the F_2 and succeeding generations. One further expression, that of tomentose leaflets, is undoubtedly present in the population, but no record of its occurrence was possible (as explained earlier). The results of Erlanson's work coupled with the present population study could fit an interpretation as follows:

Parents	$P_1P_1P_2P_2$	x	$p_1p_1p_2p_2$
	tomentose		glabrous
	$P_1p_1P_2p_2$		
F_1	puberulent		
F_2, F_3 etc.	<i>Genotype</i>	<i>Phenotype</i>	
	1 $P_1P_1P_2P_2$	tomentose	
	2 $P_1P_1P_2p_2$	pubescent	
	2 $P_1p_1P_2P_2$	pubescent	
	4 $P_1p_1P_2p_2$	puberulent	
	1 $P_1P_1p_2p_2$	puberulent	
	1 $p_1p_1P_2P_2$	puberulent	
	2 $P_1p_1p_2p_2$	glabrous, but veins puberulent	

2	$p_1p_1P_2p_2$	glabrous, but veins puberulent
1	$p_1p_1p_2p_2$	glabrous

A summary of the actual and expected results is given in Table 4. There seems from these data to be a real association between the taxonomic separation into var. *tomentosa* (pubescent) represented by three phenotypes or 70 per cent of the population and var. *setigera* (glabrous) represented by two phenotypes or 30 per cent of the population.

TABLE 4
Expression on Leaflet Surface Below in *Rosa setigera*

	var. <i>setigera</i>		var. <i>tomentosa</i>		
	Glabrous	Glabrous but Puberulent veins	Puberulent	Pubescent	Tomentose
Actual no.	30	60	108	102	....
Expected no.	18	75	114	75	18
Total actual no.		90		210	
Total expected no.		93		207	
$X^2 = 0.14; p = 0.7$					

ACKNOWLEDGMENTS

I wish to thank the many curators of herbaria who have generously loaned me material from their collections. To Dr. W. S. Flory, Jr., Blandy Experimental Farm, University of Virginia, for his guidance during the course of this study and review of the manuscript, I give my sincere appreciation.

LITERATURE CITED

- AITON, W. T. (*fil.*). 1811. *Rosa*, in W. Aiton, Hortus Kewensis. Vol. 3. London.
- ERLANSON, E. W. 1929. Cytological conditions and evidences for hybridity in North American wild roses. Bot. Gaz. 87: 443-506.
- . 1934. Pollen analysis for rose-breeders. Am. Rose Ann. (1934): 63-68.
- FERNALD, M. L. 1948. Some minor forms of *Rosa*. Rhodora 50: 145-147.
- LEWIS, W. H. 1957. An introduction to the genus *Rosa* with special reference to *R. acicularis*. Va. J. Sci. 8: 197-202.
- . 1959a. *Rosa setigera* f. *alba* a form of var. *tomentosa*. Southwestern Nat. 3: 214.
- . 1959b. A monograph of the genus *Rosa* in North America. I. *R. acicularis*. Brittonia 11: 1-24.
- LINDLEY, J. 1820. Rosarum Monographia. London. 156 pp.
- PALMER, E. J. and J. A. STEYERMARK. 1935. An annotated catalogue of the flowering plants of Missouri. Ann. Mo. Bot. Gard. 22: 375-558.

- PERSOON, C. H. 1806. Synopsis Plantarum seu Enchiridium Botanicum. Vol. 2. Paris.
- RYDBERG, P. A. 1918. North American Flora. Vol. 22. Part 6.
- TACKHOLM, G. 1922. Zytologische studien über die gattung *Rosa*. Act. Hort. Berg. 7: 97-381.
- TORREY, J. and A. GRAY. 1840. Flora of North America. Vol. 1. New York. 711 pp.
- WALTER, T. 1788. Flora Caroliniana. London.

The Southwestern Naturalist

Vol. 3, No. 1/4 (1958), p. 214 (1 page)

Rosa setigera f. alba a form of var. tomentosa

Walter H. Lewis

14b. A. PLEIACANTHA Greene var. **pinnatisecta** (G. Ownbey) Shinn. *A. pleiacantha* ssp. *pinnatisecta* G. Ownbey, *ibid.* 99.

14c. A. PLEIACANTHA var. **ambigua** (G. Ownbey) Shinn. *A. pleiacantha* ssp. *ambigua* G. Ownbey, *ibid.* 101–102.

19b. A. CORYMBOSA Greene var. **arenicola** (G. Ownbey) Shinn. *A. corymbosa* ssp. *arenicola* G. Ownbey, *ibid.* 118–120.

21b. A. GRANDIFLORA Sweet var. **armata** (G. Ownbey) Shinn. *A. grandiflora* ssp. *armata* G. Ownbey, *ibid.* 127.

23b. A. ALBIFLORA Hornemann var. **texana** (G. Ownbey) Shinn. *A. albiflora* ssp. *texana* G. Ownbey, *ibid.* 141—Lloyd H. Shinn, *Southern Methodist University, Dallas 5, Texas.*



ROSA SETIGERA f. ALBA A FORM OF VAR. TOMENTOSA.—Individuals of *Rosa setigera* Michx. may be found with leaflets pubescent on the lower surface (var. *tomentosa* T. & G.) and with leaflets glabrous below or puberulent on the main veins only (var. *setigera*). Within each of these varieties taxonomic recognition has been given to a number of unique individuals having, for example, unarmed stems (var. *tomentosa* f. *serena* (Palmer & Steyer.) Fern. and var. *setigera* f. *inermis* Palmer & Steyer.) or white petals (f. *alba* Steyer.). For the white petalled form, Steyermark (Rhodora 54: 254, 1952) does not indicate whether the leaflets are glabrous or pubescent, though one might assume from his *R. setigera* f. *alba* that it is the typical variety lacking leaflet pubescence except possibly on the main veins, i.e., var. *setigera*. Recently a specimen labelled *R. setigera* Michx. f. *alba* and collected by Dr. Steyermark (7 miles south of West Plains, Howell County, Missouri, number 78797) was examined from the S. M. U. herbarium and I found it to have pubescent leaflets of var. *tomentosa*. At Dr. Steyermark's suggestion his holotype specimen of f. *alba* was borrowed from the Chicago Natural History Museum and it too has pubescent leaflets with the herbarium determination of *R. setigera* var. *tomentosa* f. *alba*. So that no confusion will exist, the published *forma* should be altered to: *Rosa setigera* Michx. var. *tomentosa* T. & G. f. *alba* Steyer.—Walter H. Lewis, Stephen F. Austin State College, Nacogdoches, Texas.



CHROMOSOME NUMBERS FOR AMPELOPSIS ARBOREA (VITACEAE) AND LINARIA TEXANA (SCROPHULARIACEAE).—The chromosome numbers of three species of *Ampelopsis* have been previously recorded as $2n = 40$, of which only one taxon, *A. cordata* Michx., is native to North America. The chromosomes of a second North American species, *A. arborea* (L.) Koehne, have been examined from one Texas plant (1 mile west of Denning, San Augustine Co., W. H. Lewis and C. D. Smith, 27 August 1957) and it too has been found with 40 somatic chromosomes.

Of the nine taxa listed under *Linaria* in the Chromosome Atlas (Darlington & Wylie, MacMillan, 1956), six have chromosome numbers of $n = 6$ or $2n = 12$. To this list of diploid species can be added the locally common *L. texana* Scheele which has also been found with 12 somatic chromosomes. The two plants studied were collected at Center, Shelby County (M. N. Normand, 8 April 1958) and at 12 miles south of Nacogdoches, Nacogdoches County (W. H. Lewis, 12 April 1958). All specimens cited above are recorded in our herbarium (ASTC).—Walter H. Lewis, Stephen F. Austin State College, Nacogdoches, Texas.